REMARKS

Applicant respectfully thanks the Patent and Trademark Office (Office) for the withdrawal of all previous rejections.

However, the Office has rejected all pending claims, claims 1-3, in the new Office Action under 35 U.S.C. §102(e) as being anticipated by newly cited reference U. S. patent number 5,771,449 to Blasing et al. (hereinafter Blasing).

Applicant respectfully traverses this rejection.

The present invention relates to an LMDS antenna array having multiple radiating antenna elements wherein the antenna elements are adjusted in phase and amplitude to achieve certain novel radiation patterns. Particularly, claim 1 includes the limitations that the antenna elements are adjusted in phase and amplitude (1) to mitigate radiation above the horizon and (2) to decrease attenuation in radiating power with distance from the antenna. Claim 2 depends from claim 1 and further adds that the antenna elements are adjusted in phase and amplitude to mitigate nulls between lobes of combined radiated signals. Finally, claim 3 depends from claim 1 and adds that the antenna elements are adjusted in phase and amplitude to reduce excess signal power at near range.

The Office asserted that Blasing discloses a local multi point LMDS system with an antenna for transmitting a signal of reused frequency within a specified range from the antenna. The antenna having multiple radiating antenna elements, each of the antenna elements being adjusted in phase and amplitude (1) to mitigate radiation above the horizon, for example, due to weather conditions (referring to Figure 3 and column 8, lines 7-17), (2) to decrease attenuation in radiated power with distance from the antenna (referring to column 21, lines 40-53), (3) to mitigate nulls between lobes of combined radiated signals collectively from the antenna elements,

for example, the maximum and minimum power level is maintained by implementing the low sidelobe or shaped beam antennas adjacent to sectors (referring to column 23, lines 35-50), and (4) to reduce excess signal power at near range, for example, an excess power output is reduced at near range or at adjacent sectors by eliminating unwanted energy by using low sidelobe antennas (see column 22, lines 35-50).

Of course, LMDS systems with antennas with multiple radiating elements are known in the prior art and Blasing is an example of one such system, Blasing clearly does not teach any of the four phase and amplitude design elements set forth as the key limitations of the claims. More particularly, Applicant has reviewed the Blasing reference and, particularly, the sections cited in the Office Action and, contrary to the Office's assertions, has found none of those design elements disclosed or discussed in the reference.

Applicant shall more specifically address each element individually.

With respect to mitigating radiation above the horizon, the Office asserts that "radiation or signal power output can be attenuated above the horizon, for example, due to weather conditions between some certain geographical regions". Applicants do not understand the above quoted statement. First, weather conditions have nothing to do with adjustment of the phase and amplitude of the radiated signal across the radiating elements, as claimed. Therefore, even if weather did affect radiation above the horizon, it does not appear to have any bearing on the claims since any such effect would not be the result of adjustments in phase and amplitude of the transmitted signal across the antenna elements, but of external conditions.

Secondly, with respect to the limitation of claim 1 of attenuating power with distance from the antenna, the Office referred to column 21, lines 40-53, which read:

> The polarization isolation provides 20 to 30 dB of isolation even if the antenna arrays that serve different sectors are in the same physical space (separated only by the size of the respective antennas). Better performance can be realized by implementing low sidelobe or shaped beam antennas. An antenna array with a uniform illumination will produce a sidelobe that is 13 dB lower than the main antennas's gain at the center of the beam. This first sidelobe can be reduced to 20 or 30 dB with proper attention to design of the amplitude and phase characteristics of each radiating element. These antennas are used to ensure that the next sector over receives interfering signals from the once removed adjacent sector that are 7 to 17 dB lower in size. The signal to noise ratio is also enhanced using this technique.

The above quoted section of Blasing does not discuss attenuation as a function of distance from the antenna. Rather, it discusses attenuation as a function of the radiation angle. Accordingly, Blasing does not meet this limitation either.

Accordingly, claim 1 clearly distinguishes over the prior art of record.

With respect to claim 2 and the limitation of mitigating nulls between lobes of combined radiated signals, the Office refers to column 23, lines 35-50 of Blasing. Column 23, lines 21 through 61 state.

> Sources of Potential Signal Interference
>
> In a system such as that described in this Specification, a major concern is co-channel interference originating from multiple transmitters contained in various sectors and/or cells. Four sources of such interference require special concern:
>
> a) Spillover interference from once sector to another, as experienced by receivers located along the boundary between sectors (See Spillover "8" in FIG. 43B). This factor becomes increasingly critical as sector beamwidth decreases, as the portion of a sector affected by spillover becomes an increasingly large percentage of the total area.
>
> b) Interference arising from the first sidelobe of an antenna transmission pattern. The intensity of this interference source peaks in the middle of the adjacent sector. (See First Sidelobe "2" in FIG. 43B.)

c) Interference arising from the second sidelobe of an antenna transmission pattern. Intensity peaks in the center of the second adjacent sector. (See Second Sidelobe "3" in FIG. 43B.) Typically, interference from third and higher sidelobes can be considered negligible.

d) Interference experienced at receivers located in an adjoining cell. (See FIG. 43C). These may be located at the node or at customer premises.

In the basic embodiment of the invention, isolation from the above classes of interference can be obtained in three ways:

a) Through horizontal directionality, providing the ability to reject signals arriving from adjacent sectors or adjoining cells, where the angle of incidence differs significantly from the direct horizontal line between the transmitter and receiver.

b) Through vertical directionality, providing the same ability to discriminate between transmissions from the closest node and one located in an adjoining cell.

c) Through signal attenuation due to free-space, atmospheric, and rainfall attenuation. This factor tends to favor a signal from a nearer, rather than a more distant source.

The Office appears to assert in the Office Action that this section of Blasing teaches a system in which "the maximum and minimum power level is maintained by implementing the low sidelobe or shaped beam antennas in adjacent sectors".

The above quoted portion of Blasing does not appear to mention nulls between lobes, let alone mitigation of them. Further, this section of Blasing does not even appear to teach implementing low sidelobes or shaped beam antennas in adjacent sectors as asserted by the Office, and, even if it did, low sidelobes is very different than minimizing nulls <u>between</u> lobes.

Accordingly, claim 2 distinguishes over the prior art for all of the reasons set forth above in connection with claim 1, (from which it depends) as well as the reasons discussed immediately above in connection with the limitation added by claim 2.

With respect to claim 3 and the limitation concerning reduction of excess signal power at near range, the Office asserted that Blasing discloses this feature in column 22, lines 35-50, which read:

> Use of Shaped Beam or Ultra Low Sidelobe Antennas to Improve Signal to Noise in Adjacent Sectors
>
> An additional aspect which may be implemented in conjunction with the system described above is to use low sidelobe antennas as the transmitter sources at the node. This gives the advantage of reducing the sidelobe in the one over adjacent sectors where the polarization is again the same as for the transmitting antenna. There are two basic approaches. The first involves using antennas which distribute power to the individual radiating elements so that the center-most elements radiate more power than the elements at the periphery of the antenna. In this fashion, the first sidelobe exposed to the one over adjacent sector is substantially lower. This results in a lower level of unwanted energy in the one over adjacent sector.

Once again, this section of Blasing does not appear to have anything to do with the subject matter at issue, namely, reducing excess signal power at near range. Rather, this section addresses radiation as the function of the angle of radiation. The feature claimed in claim 3 is discussed on page 6, lines 17 through page 7, line 12 and Figure 1 of the present application. This feature is demonstrated in Figure 1 most notably by the difference between trace 6 (prior art) and trace 7 (invention) in the zero to 1000 meter portion of the graph. The above cited section of Blasing simply has nothing to do with near range gain.

Accordingly, claim 3 distinguishes over the prior art for all of the reasons set forth above in connection with claim 1, from which it depends, as well as the additional reasons set forth above in the discussion of near range signal power.

Applicant has also added new claims 4-6, which are method claims essentially corresponding to claims 1-3, respectively. Accordingly, these new claims are allowable over the prior art for at least the reasons discussed above in connection with claims 1 through 3.

In view of the foregoing amendments and remarks, this application is now in condition for allowance. Applicant respectfully requests the Examiner to issue a Notice of Allowance at the earliest possible date. The Examiner is invited to contact Applicant's undersigned counsel by telephone call in order to further the prosecution of this case in any way.

Respectfully submitted,

Theodore Naccarella
Registration No. 33,023

Synnestvedt & Lechner LLP
2600 Aramark Tower
1101 Market Street
Philadelphia, PA 19107

Telephone: 215-923-4466
Facsimile: 215-923-2189

Attorneys for Applicant

M:\TNaccarella\CLIENTS\Whitaker\25532\PTO\AMENDMENT.wpd